ENVIRONMENTALLY PREFERRED PAINT OPTIONS
National Park Service (NPS) - Pacific West Region
November 2002

A Little Background on Paint:

Conventional paints are generally classified into two categories: water-based (in which the solvent is water) and oil-based (in which the solvent is an organic liquid, usually derived from petrochemicals). Oil-based paints are sometimes referred to as solvent-based. Paints consist of a resin or binder, pigments, and a carrier. They also consist of solvents, toxic metals and volatile organic compounds (VOCs) that can cause smog, ozone pollution, and indoor air quality problems with negative health effects. These unhealthy ingredients offgas into the air during the application and curing of paints, and even after the paints are dry. Once paint is applied, the carrier evaporates leaving behind a solid coating. In oil-based paints the carrier is a solvent consisting of VOCs. Titanium dioxide, a pigment used in nearly all paint production, is manufactured using a highly polluting and energy intensive process. It reacts with sunlight to contribute to smog when used in exterior application, and poor indoor air quality when used in interior application. Fungicides and preservatives (collectively known as biocides) are added to latex paints to combat mildew. The danger of VOCs has resulted in government regulations and consumer demand forcing continuing changes in paint formulations. Newer formulations contain more paint solids and less solvent, and there is a shift away from oil-based to waterborne or latex paints. Because they do not use solvents as the primary carrier, latex paints emit far fewer volatile organic compounds upon application. They also do not require solvents for the cleaning of tools and equipment.

Federal Requirements and NPS Policy for Paint:

Environmentally preferable paint complies with:

- EO 13101: Greening the Government Through Waste Prevention, Recycling, and Federal Acquisition (1998).
- The Resources Conservation and Recovery Act - Section 6002 (RCRA, 1976).
- Comprehensive Procurement Guideline (CPG) for Products Containing Recovered Materials- 40 CFR 247 (Table 1):

Table 1: Recommended Recovered Material Content Ranges

EPA CPG for Latex Paint		Percentage of Post Consumer Materials	Percentage of Total Recovered Materials
Consolidated*	Recovered Material	100	100
Reprocessed**			
-white, off-white, pastel	Recovered Material	20	20
-grey, brown, earthtones, and other dark colors	Recovered Material	50-99	50-99

*Used for covering graffiti, where color and consistency of performance are not primary concerns.
**Used for interior and exterior architectural applications such as wallboard, ceilings, and trim; gutterboards; and concrete, stucco, masonry, wood, and metal surfaces.

Table 2: EPA VOC Voluntary and Regulatory Guidelines for Paints

	Voluntary VOCs (Green Seal Standard)	Regulations (effective 9/13/99)
Interior		
Flat	50 g/l	250 g/l
Non-Flat	150	380
Exterior		
Flat	100	250
Non-Flat	200	380

A Park's goal in paint management should be to discontinue the use of all solvent-based paints. Good housekeeping practices (e.g., avoid over spray, donate excess inventory) and waste segregation (e.g., keep thinner out of waste latex paint) can also reduce the amount of paint waste generated. Environmental concerns occur not only when paint chemicals offgas and contribute to ozone pollution, but when paint becomes a waste as well, which is why oil-based paint is likely to be a RCRA hazardous waste. Latex paint is usually not a hazardous waste, but in some cases the quantity of toxins could result in the need to characterize the waste. Parks are responsible for their hazardous waste from "cradle to grave." This means that the Park must ensure that all waste is properly managed, transported, and disposed of according to federal, state, and local regulations. For these reasons, the NPS is committed to discontinuing the use of all solvent-based paints.

Why Environmentally Preferable Paint is Better for Your Health and the Environment:

As described above, solvent-based paints create safety and health as well as environmental concerns for the NPS. Safety and health concerns center on worker exposure to solvent vapors while in storage or while in use. As with all solvents, adequate ventilation is vital for fire protection in storage, and worker protection in application. Environmentally preferable paint:

- Lessens the amount of ground level ozone pollution (e.g., global warming), and negative impact to plant and animal/human health.
- Is found locally and their purchase helps support local economies and jobs.
- Uses far less toxic solvents and less toxic metal compounds. These ingredients pollute the air and can have long term health consequences.
- Includes those made from recovered content (excess paint which has been recycled).
- Use by the NPS supports Federal greening and sustainability goals, including the purchase and use of recycled content, low toxic, and environmentally safe products.

Most major paint manufacturers make some form of a zero (solvent-free) or low-VOC paint. No paint can truly have "zero" VOCs, but less than 5 grams per liter (g/l) can be considered "zero" VOC. The impact on indoor air quality and employee health is the primary issue with VOCs in paint, rather than the impact on the ozone. Total VOC level is just one indicator of healthy paint. Zero or low-VOC paint is usually a low-odor paint but a zero or low-VOC paint does not necessarily mean it is a non-toxic paint. Zero-VOC products offered by major paint manufacturers meet Federal regulations for VOC levels (see Table 2), but they most likely contain some highly toxic ingredients, such as ammonia. Ammonia can be a very irritating compound, especially to chemically sensitive individuals. Other toxic ingredients include

formaldehyde, crystalline silica, and fungicides and bactericides. Except for low biocide paint, all paint contains toxic preservatives.

Environmentally preferable paints are better for employee health and risk management because:

- Employees can work more safely with environmentally sensitive product in any type of painting situation (which does not exclude using proper protective gear and taking OSHA precautions).
- Employees' risk for developing chemical exposure based allergy and illness is much less.
- Employees working in freshly painted buildings are less likely to be affected by outdoor/indoor painting activities, which create on-the-ground air pollution.
- Proper renovation and use of these paints can rehabilitate buildings with Sick Building Syndrome.
- Workers are more productive in non-toxic environments, less prone to illness (which saves on insurance claims), and employees feel that their employer cares about their personal health.

Environmentally Preferable Paint Options:

Recycled Paint (see Table 1): Recycled paint (also known as recovered content paint), conserves landfill space and eliminates the risk of improper disposal, keeping toxic paints out of the waste stream. Recycling paint also reduces the consumption of virgin resources. The Federal requirement to use recycled content paint is intended to reduce the impact on groundwater and air quality from the disposal or incineration of this waste. Purchasing this product under the Federal requirement will also help create a market for these products. Recycled paint:

- Is post consumer latex paint made by a variety of methods.
  - Reprocessed paint has been sorted usually by type (interior vs exterior), by light and dark colors, and by finish (high-gloss vs flat). The reprocessor adds raw materials to meet the performance and color requirements expected by the end user.
  - Consolidated paint is paint with similar characteristics (such as type, color, and finish) that is consolidated at the point of collection. The post consumer paints are blended together and repackaged, usually with few or no new ingredients added to improve the performance of the resulting paint. It is typically used for exteriors or as an undercoat.
- Is very economical for general exterior painting projects. At $1 to $10 a gallon, it can be a real bargain, but colors may be limited.
- RCRA-D, Executive Order 13101, and the CPG, require the use of recycled content products.
- May not contain the lowest VOC level due to the mixing and recycling of old paints. VOC levels should, however, meet the regulatory standard (see Table 2). GSA recycled paints meet this standard.

Zero to Low VOC Paint:

- Meets or exceeds EPA standards (see Table 2).
- Are designed specifically to reduce air pollution (smog and ozone pollution).

- Can still contain several types of toxins which can be a risk for employee health.
- May be the preferred paint for interior use if indoor air quality and health concerns are the number one priority.

Paint Picks for the National Park Service, Pacific West Region:

Recycled Paint:

1. GSA Recycled Latex Paint GSA Hardware Superstore 800-488-3111, Tech. 816-916-7315
www.gsaadvantage.gov , www.r6.gsa.gov/fss/hac/

- A minimum of 30% volume solids.
- Recycled latex paint contains a minimum of 50% post consumer waste.
- Use on interior or exterior wallboard, concrete, stucco, masonry and wood.
- Maximum VOC 200 g/l.
- Remanufactured and recycled, CFC-free, Chromate-free.
- GSA recycled paint – Schedule 834 800.
- Selected by Department of Interior, Washington, DC, for interior remodeling project.

2. Kelly Moore Enviro-Cote Paint 800-874-4436, Evans Bradshaw 916-921-0165
www.kellymoore.com

- 50%-80% recycled content.
- Low price (lower than standard paint).
- Available in small quantities.
- No black or pure white, but other colors can usually be mixed successfully.
- General pricing – flat $6.50/gal, semi-gloss $8.50/gal.
- Low or no VOC.
- Recommended and used by Presidio of San Francisco.

3. Amazon Environmental, Inc. 800-566-2396 **www.amazonpaint.com**

- 100% Recycled content.
- Available in small or bulk quantities.
- Six color choices.
- General Pricing: $7-$14/gal.

4. Passonno Paints 518-489-1910 **www.passonnopaints.com**

- 80-90% Recycled content interior latex paint.
- Flat or semi-gloss.
- $7/gal.

Low to Zero-VOC:

1. Miller Paint 503-233-4491 **www.millerpaint.com**

- 138 VOCs and non-toxic primer.
- No biocide or fungicide content.
- Tintable in off-white and pastel color bases.
- Will custom make to Park specs and personally work with Parks to fit painting needs.
- General pricing – contractor $23.95/gal, price reduction for large quantities.

- Local to the Northwest (i.e., Seattle/Portland) with excellent local references.

2. Advanced Formulations Safecoat (AFM, San Diego) 800-239-0321, 619-239-0321. **www.built-e.com, www.afmsafecoat.com**

- Zero-VOCs, non-toxic, low odor (also makes a low-VOC paint) paints and finishes.
- Excellent references and performance ratings.
- Diverse product line includes industry standard sealant and AFM Naturals Clear Penetrating Oil (water repellant, sun protection).
- Over 800 custom colors and 12-15% discount available.
- Out performs regular paints through a unique bonding process, which prevents air pollution.
- Created due to plant employee illness; entire factory process reconfigured.
- Avoids phenol based biocides, but zero-toxins may be less effective for mildew protection.
- General pricing – primer $27.90 – $43.90/gal, paint $30.90 - $36.90/gal, hard clear finishes $32.90 – $80.90/gal, stains $26.90 – 60.90/gal.
- Selected by DSC Project Manager for use in Yosemite NP new construction.
- Used by Fort Clatsup National Memorial for both exterior and interior.

3. Best Paint Company 206-783-9938. **www.built-e.com**

- Interior – Microsol: flat, eggshell, satin, semi-gloss; zero VOCs, zero toxins.
- Exterior – Duracryl: low sheen, semi-gloss, low VOCs.
- Primer/stain blocker – low VOCs, water-based, can also be used on metal.
- Good performance, good references, and over 600 colors, and high solids.
- Local to Seattle w/ 15 Year Warranty.
- Generous Federal government discounts.
- Created by a professional painter who developed an allergy to regular paint.
- General pricing – Microsol $14.67 – $20.69/gal, Duracryl $17.39 - $25.29/gal, primer $17.29 – 20.07/gal.
- Recommended by the NW Environmental Home Center.

Making a Choice:

Deciding among environmentally preferable paints should take into account each site's individual needs. Although the Federal government mandates the use of recycled content products, other environmental attributes may take precedence over recycled content (e.g., non-toxic to promote indoor air quality and human health). Beware of claims: research may be necessary to determine if a product truly does meet or exceed EPA and other environmental standards. Many paint companies state that their product is "low-VOC," but since government standards for acceptable levels of VOC have been lowered recently, these so-called "low-VOC" paints may simply be within the standard (see Table 1). Check to see that essential ingredients which can compromise paint performance are not left out. If paints do not perform at the industry standard and require frequent repainting, they are not economically viable and not environmentally safe. For example, if three coats of a zero or low-VOC paint is needed for proper coverage, then the paint is emitting three times the amount of VOCs, as well as costing additional time, labor, and

materials. Purchasing and testing the paint options in your local area may prove to be the most sustainable option and help foster new GSA contracts.

The most environmentally preferable paint option is to use paint only where necessary, choose the type, brand and quantity wisely, properly store it, properly prepare the surface and apply it, and properly dispose of it (preferably reusing and recycling any excess paint first). The substitution of toxic paints with alternative products presents a lesser risk to human health and the environment and is encouraged.

REMEMBER: To get quality results from any paint, the surface ***must*** be thoroughly prepared and primed. The best paint can easily fail due to inadequate preparation of the surface. ***Proper surface preparation is especially essential with alternative paint products.***

Checklist for Paints *(Volume 8, number 2, Environmental Building News, February 1999, Feature Article: Paint the Room Green)*

Product Selection

- Consider designing surfaces that don't require painting, such as integrally pigmented plaster walls and natural wood trim.
- Choose durable paints that meet all performance requirements.
- Use light colored paints for interior ceilings and walls to help distribute day lighting and minimize the electric lighting requirements.
- When choosing paint for a chemically sensitive person, no product can be considered safe until that person has tested it. Suppliers of paint to the chemically sensitive are aware of this need and can provide their products in small sample packages for such tests.
- Buy paints from companies that actively encourage or sponsor paint collection and recycling programs.
- Choose paints with the lowest VOC levels possible, especially if the space to be painted will be occupied soon after painting, or if it contains fabrics or other materials that can absorb and later re-release VOCs.
- Choose paints that have been independently certified by an ecological labeling group, such as Green Seal, to avoid the inclusion of especially toxic ingredients.
- Check technical data sheets for paints to determine solids content and resin type. The most durable latex paints are generally made with 100% acrylic resin and over 35% solids.
- Check Material Safety Data Sheets (MSDS) for paints to determine potential health effects of major constituents. MSDSs' don't list ingredients used only in small quantities, however, such as preservatives.
- Consider oil-based paint only for use over bare wood, or over old surfaces with layers of old, chalking, oil-based paint. Even on these surfaces, investigate latex options first.
- Consider other functions that the paint might serve, such as that of providing a vapor retarding coating to prevent moisture from migrating into exterior wall cavities. Most alkyd paints serve as vapor retardants, but to get this functionality from latex paints requires the use of specifically formulated products. Most major paint manufacturers have such products available. This feature may be desirable in cold climates but could be counterproductive in hot climates.

Painting

- Calculate paint needs carefully to avoid ordering more paint than necessary. Be aware, however, that colors may not match precisely from one can to the next, so all paint of a given color should be mixed together before starting the job. A handy paint quantity calculator is available on-line at: **www.kellymoore.com**
- Follow manufacturers' application instructions to ensure proper coverage and long term performance.
- Before removing or scraping old paint, test for lead; if lead paint is found, a special encapsulate should be considered (see EBN Vol. 5, No. 6).
- Even so-called nontoxic and zero-VOC paints release trace amounts of chemicals to the air that some people may find irritating. Increased direct-to-outdoors ventilation is always a good idea for areas being painted, and paint fumes should never be allowed to circulate through a building's HVAC system. With certain paints, respirators with charcoal filters for organic compounds should be used.

Dealing with the Leftovers

- Small amounts of leftover paint should be carefully labeled and stored for use in touching up damaged areas in the future. The NPCA recommends covering the open can with plastic wrap, closing the lid tightly, and storing the paint upside down to prevent a film from forming on the surface. Latex paints do not represent a fire hazard like oil-based paints, so storing them is less of an issue.
- Donate leftover paint to a local low-cost housing group, community assistance organization, or theater organization that can make use of the paint.
- Contact local solid waste or hazardous waste management authorities to find out about opportunities to recycle paint. Although it is legal to let latex paint dry and dispose of the hardened resin with regular trash, this approach both wastes the resources that went into making the paint and releases all of the paint's VOCs into the air needlessly.
- Oil-based paints that must be discarded should be treated as hazardous waste. Most communities have certain days for hazardous waste disposal; contact your municipal office to find dates and drop-off locations.

Recommended References and Web Sites:

- Environmental Home Center (Seattle, WA) researches products for you and offers 15-20% discount for government agencies; 8 brands of ecologically safe paint products: **www.built-e.com**
- EPA, *Painting the Town Green: Aberdeen Proving Ground's Paint Pilot Project,* April 1999 (EPA742-R-99-005) examines environmental paints and VOC levels: **www.epa.gov/opptintr/epp/documents/doccase.htm**
- EPA Comprehensive Procurement Guideline web site for purchasing recycled content products: **www.epa.gov/cpg**
  The CPG requirement for paint can be found in *EPA 2000 Buy-Recycled Series Construction Products*, April 2000 (EPA530-F-97-035) available at: **www.epa.gov/cpg/pdf/const-00.pdf** For information on paint products, specifications, case studies, technical data, and GSA link: **www.epa.gov/cpg/products/paint.htm** or call the RCRA hotline at 800-424-9346.

- EPA Environmentally Preferable Purchasing Database. Specs and contract language for paints are located in the "Hardware Store" at: **www.epa.gov/opptintr/epp**
- Green Seal is an independent green product certifier, with information on environmentally safe paints: **www.greenseal.org/cgrs/report.htm**
- GSA *(*Paints and Related Products) includes green links to an Environmental Attributes Guide for Paints and a VOC Cross Reference: **www.fss.gsa.gov/environ/** [Under "Publications" on the left]. GSA's Hardware and Appliance Center (includes paints, sealants and adhesives) You can also access GSA paints at: **www.r6.gsa.gov/fss/hac/** or **www.gsaadvantage.gov**
- GSA's environmental information spreadsheet displays key attributes that apply to federal paint specifications along with NSN numbers of stocked GSA products. **www.fss.gsa.gov/environ** [select "safer paints, cleaning and other chemical product" on the right] [select "environmental programs – environmentally responsible coatings offering" on the right]
- Malin, Nadav, *Paint The Room Green,* Environmental Building News*, Vol.8, Number 2*, Battleboro, Vermont, February 1999
- National Park Service, *EnviroFact Sheet, Waste Paint and Coatings Management,* Washington, D.C., March 1999: **www.nps.gov/renew/wpcmgt.pdf** Includes details on waste paint handling, storage, disposal, and characterization.
- National Paint and Coatings Association can be found at **www.paint.org** Contains information on paint and container recycling, lead paint, and more.
- Oikos is a green building site with information on environmentally preferable paint: **www.oikos.com/products/**

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This report was produced by and for the National Park Service. Comments and feedback should be sent to: sonya_capek@nps.gov
Of particular interest are testimonials of environmentally preferable paint use in the NPS.
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